CHANNEL ISLAND SONG SPARROW (*Melospiza melodia graminea*)

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Criteria Scores

Population Trend	Range Trend	Population Size	Range Size	Endemism	Population Concentration	Threats
15	15	5	10	10	10	5

Special Concern Priority

Currently considered a Bird Species of Special Concern (year-round), Priority 1. None of the originally described endemic subspecies of song sparrows found on the Channel Islands were included on the original prioritized list (Remsen 1978), or on CDFG's (1992) unprioritized list. Santa Barbara song sparrow (*Melospiza melodia graminea*) was first listed as endangered in 1973 by the USFWS but was later removed from that list when it was determined to be extinct (USFWS 1983).

Breeding Bird Survey Statistics for California

Data inadequate for trend assessment at the subspecies level (Sauer et al. 2000). Monitoring data collected during the breeding season on Santa Rosa and San Miguel islands provide a source of numerical data on current abundance of the two remaining extant populations of *M. m. graminea* (see Recent Range and Abundance in California).

General Range and Abundance

The Channel Island song sparrow (*Melospiza melodia graminea*) is resident on islands off southern California (San Miguel, Santa Rosa, Santa Barbara [formerly], and San Clemente [formerly]), and on Islas Los Coronados off northern Baja California (Jones and Collins in press, Patten 2001). Although song sparrows were listed as a breeding resident on Anacapa island (Grinnell and Miller 1944, AOU 1957, Patten 2001), a review of all available records indicate that the species is only a casual spring and fall transient to this island (Jones and Collins in press).

Until Patten's (2001) revision, song sparrows on the Channel Islands were assigned to one of four endemic subspecies as follows: *graminea* on Santa Barbara island (Townsend 1890), *micronyx* on San Miguel island (Grinnell 1928), *clementae* on Santa Rosa and San Clemente islands (Townsend 1890, AOU 1957), and *coronatorum* on Islas Los Coronados (Grinnell and Daggett 1903). Patten (2001) considered song sparrows on Santa Cruz island to be an intergrade population between adjacent mainland (*heermanni*) and island (*graminea*) subspecies. Except for minor differences in size and color, measurements and plumage characters used to describe each of these insular endemics violate the 75% rule and for this reason Patten (2001) merged all of the island subspecies into a single endemic (*M. m. graminea*). This subspecies differs from the adjacent mainland subspecies *heermanni* by its broad silvery gray fringed mantle feathers, narrower breast, malar, and dorsal streaks, and grayer flanks (Patten 2001).

Seasonal Status in California

The channel island song sparrow is a sedentary resident; breeding season extends from late February until mid-July (Jones and Collins in press).

Historical Range and Abundance in California

Howell (1917) recorded song sparrows as an "abundant resident" on Santa Barbara island, as a "common resident" on Los Coronados, San Clemente, San Miguel and Santa Rosa islands, and as a "less common" resident on Santa Cruz island. Grinnell and Miller (1944) described the song sparrow as a "common" resident on San Miguel and San Clemente islands, an "abundant" permanent resident on Santa Barbara island, and a "less numerous" permanent resident on Santa Rosa, Santa Cruz, and Anacapa islands.

San Miguel Island. Most early observers have reported song sparrows as "common" on San Miguel island (Willett 1910, 1912, 1933; Howell 1917, Grinnell and Miller 1944. Sumner and Bond (1939) recorded the species as "abundant" on the main island and as breeding in prickly pear (*Opuntia* sp.) cactus and wild cucumber (*Marah macrocarpus*) on Prince island.

Santa Rosa Island. In July 1892, song sparrows were "common in the wooded canyons about water" (C. P. Streator unpubl. field notes). Most early observers listed them as a "common" or "fairly common" resident in suitable habitat (Howell 1917, Sheldon unpubl. field notes, Grinnell and Miller 1944).

Santa Barbara Island. Grinnell (1897) listed song sparrows as the "most abundant bird" on Santa Barbara island. Most of the other early observers also recorded it as "abundant" (Townsend 1890, Wright and Snyder 1912, Howell 1917, Sumner and Bond 1939, Grinnell and Miller 1944).

San Clemente Island. Grinnell (1897) recorded it as "quite numerous," Linton (1908) reported it as "an abundant resident," and most of the other early observers listed it as a "common" resident (Howell 1917, Grinnell and Miller 1944, Dixon unpubl. field notes).

Recent Range and Abundance in California

The breeding range and breeding status of song sparrows on the Channel Islands has changed during the later part of the 20th Century. Breeding populations on Santa Barbara and San Clemente islands have been extirpated as a result of vegetation striping from feral herbivores and increased rates of predation from feral cats and a compliment of native avian and mammalian predators. Based on historic qualitative estimates of abundance, song sparrow populations on San Miguel and Santa Rosa islands are more abundant today than they were historically when feral herbivores were present. With the removal of feral herbivores from these three islands, scrub habitats favored by song sparrows have been increasing and as a result song sparrow numbers appear to be on the rise on these three islands. Today the Channel Island song sparrow is a common breeding resident on San Miguel and Santa Rosa islands and an intergrade population of song sparrows on Santa Cruz island are an uncommon and local breeding resident (Jones and Collins in press). Transient song sparrows from the mainland are occasionally reported during the fall and winter on islands that do not currently support resident breeding populations (Jones and Collins in press).

San Miguel Island. In 1968, Huber (1968) reported that song sparrows were "an abundant breeding resident over the entire island." By 1973, H. L. Jones listed them as "very common away from the barren W 1/3 of the island" (Jones and Collins in press). Island-wide estimates of 980-1,200 and 2,000 birds were obtained in 1978 and 1986, respectively (Collins 1979, Sogge et al. 1991). In 1985 and 1986, Sogge and van Riper (1988) recorded song sparrow densities of 7.1 birds/ha and 10.0 birds/ha on their study plots. Line-transect monitoring surveys conducted by the NPS between 1993 and 1998 recorded an average density of 1.70 birds/ km^2 (Fancy 2000). Song sparrows have apparently increased in abundance and range on San Miguel island since the removal of feral herbivores from the island in the early-1970s.

Santa Rosa Island. Miller (1951) listed song sparrows as common in 1950, and Collins (unpubl. field notes) recorded them as "common to abundant" in 1975 and 1976. A 5-year average of 0.60 birds recorded/station using variable circular plot (VCP) counts on Santa Rosa island, with song sparrows observed at an average of 38.9% (7.7%-66.7%) of the VCP count stations (Fancy 2000). Clearly, these recent surveys indicate that today song sparrows are common and widely distributed on Santa Rosa island.

Santa Barbara Island. Despite the destruction of much of their *Coreopsis* nesting habitat from clearing for farming and from browsing by introduced rabbits (*Oryctolagus cuniculus*), song sparrows were still present in fair numbers at least through the spring of 1958 (Sumner 1958). However, a fire in 1959 destroyed most of the remaining scrub and *Coreopsis* habitat preferred by song sparrows on Santa Barbara island (Philbrick 1972). Song sparrows disappeared as a resident breeder sometime during the 1960s. Intensive surveys in 1970s (Hunt and Hunt 1974, Smail and Henderson 1974, H. L. Jones unpubl. data) and 6 years of intensive monitoring surveys in the 1990s (Fancy 2000) all failed to locate any resident song sparrows. The Santa Barbara song sparrow (*M. m. graminea*) was officially listed as extinct in 1983 (USFWS 1983).

San Clemente Island. The last documented sightings of the Channel Island song sparrow on San Clemente island were of 2 birds seen on 24-27 May 1968 (J. Diamond unpubl. field notes), and one bird seen at Wilson cove on 9 April 1972 and 14 April 1973 (Leatherwood and Coulombe 1972, H. L. Jones unpubl. field notes). Intensive surveys for this species in May 1974 failed to locate any additional resident birds on the island (Stewart and Clow 1974). The Channel Island song sparrow is thought to have been extirpated from San Clemente island since the early 1970s.

Ecological Requirements

The ecological requirements of the Channel Island song sparrow are basically very similar to those described for song sparrows on the mainland. They include: (1) moderately dense scrubby vegetation for nesting, escape cover, and foraging; (2) a source of standing or running water, or in dry scrub habitats, constant moisture from fog or dew; (3) adequate light; and (4) exposed ground or leaf litter for foraging (Marshall 1948, Shuford 1993). On the islands, song sparrows are most abundant in areas of dense shrubs, however, they also inhabit grasslands with scattered shrubs, *Artemisia-Opuntia*-grass associations, and at least historically on Santa Barbara island dense grasslands (Townsend 1890, Grinnell and Miller 1944, Miller 1951, Sogge and van Riper 1988). On San Clemente island, song sparrows inhabited "low vegetation of considerable variety, such as. . . . .brush in creek and canyon bottoms, low bushes and weed patches on mesas and in ravines, tangles of cactus and vines, grass clumps intermixed with cactus, and planted hedges about settlements" (Grinnell and Miller 1944:554). At Santa Barbara island they inhabited brush covered slopes and ravines, thickets of giant coreopsis (*Coreopsis gigantea*), and areas vegetated with long coarse grass (Townsend 1890, Grinnell 1897, Smail and Henderson 1974). On San Miguel island, song sparrows were "most abundant in areas of continuous dense shrubby vegetation" but were also numerous "in small isolated vegetated gullies and in mixed scrub/grassland habitat" (Sogge and van Riper 1988:10). Vegetation structure "influenced song sparrow density through nest-site and resource availability, as well as protection from weather and predators" (Sogge and van Riper

1988:65-66). Song sparrows defended areas of higher canopied shrub density, and lower perennial herb density. This type of scrubby habitat provides song sparrows with suitable protected nest sites, song perches, protective cover from weather and predators, and open foraging areas under the shrub canopy (Sogge and van Riper 1988). Channel Island song sparrows inhabit coastal scrub and scrub/grassland habitats often removed from available sources of surface water. Frequent dense fog on the islands supplies moisture in the form of dew and fog drip to birds in these dryer habitats (Grinnell and Miller 1944, Miller 1951, Sogge and van Riper 1988).

Height and density of scrub cover are habitat features important for Channel Island song sparrow nesting (Sogge and van Riper 1988). On San Miguel island, song sparrows preferred to nest in shrubs of *Haplopappus venetus, Lupinus albifrons,* and *Baccharis pilularis* (Sogge and van Riper 1988). Channel Island song sparrows are also known to nest in *Opuntia* sp., *Artemesia californica, Salix lasiolepis, Coreopsis gigantea,* and *Lycium californicum* (Grinnell 1897, Linton 1908, Howell 1917, Collins 1979). Nests on San Miguel island were usually constructed on the leeward side of shrubs away from strong prevailing northwest winds, and were often located in vegetation within densely vegetated gullies or occasionally on more open, grassy plateau areas (Sogge and van Riper 1988). In most years, Channel Island song sparrows are double-brooded (Collins 1979, Sogge and van Riper 1988).

Song sparrows usually forage on the ground but occasionally forage in low vegetation and under the cover of dense thickets where they pick food (plant seeds and insects) from the bare ground, or leaf litter under or at the base of bushes (Marshall 1948, Shuford 1993). The year-round diet of song sparrows in California is composed of 21% animal matter (insects) and 79% vegetable matter (plant seeds; Beal 1910, $n = 321$). Insects such as beetles, caterpillars, bees, ants and wasps, true bugs, and flies, are an important component of the diet of song sparrows in the spring when animal prey comprises 71% of their overall diet compared to 3% of their diet in September (Beal

1910, Shuford 1993). Anecdotal observations from San Miguel island suggest that the Channel Island song sparrow has a diet similar to song sparrows on the mainland (Collins 1979).

Threats

The principal threats to the channel Island song sparrow include: (1) habitat degradation from overgrazing by introduced herbivores (goats, sheep, cattle, pigs, mule deer, elk, and european rabbits), (2) destruction of scrublands and woodlands from wildfires and/or from earlier agricultural conversions, and (3) increased predation from native (island fox, American kestrel, common raven, and loggerhead shrike) and nonnative (feral cat and black rat) predators. These factors are believed to have contributed to the extirpation of Channel Island song sparrows from San Clemente and Santa Barbara islands (Hunt and Hunt 1974, Lynch and Johnson 1974, Stewart and Smail 1974). Fortunately nearly all of the feral herbivores have been removed from islands on which Channel Island song sparrows were known to have bred. Introduced mammals that pose a threat to *M. m graminea* include feral cats on San Clemente island, assuming song sparrows are reintroduced onto this island, and black rats on San Miguel and San Clemente islands. As the islands revegetate following the removal of feral herbivores, wildfires may become more likely as vegetation recovers. A disastrous wildfire in 1959 on Santa Barbara island was one factor that contributed to the extirpation of song sparrows from this island (Lynch and Johnson 1974) and may have played a role in the elimination of song sparrows from San Clemente island. As long as there is adequate protective scrub cover, Channel Island song sparrows should be able to tolerate moderate levels of predation from native and nonnative predators. Cowbird parasitism is not expected to affect Channel Island song sparrows since cowbirds are not known to breed on any of the Channel Islands (Jones and Collins in press).

Management and Research Recommendations

- implement a reintroduction program with the goal of reestablishing viable breeding populations of Channel Island song sparrows on Santa Barbara and San Clemente islands.
- complete feral animal eradication programs and support the implementation of ecological restoration plans proposed by the Navy for San Clemente island, and the National Park Service for Santa Rosa and Santa Cruz islands.
- implement a genetic study using mitochondrial and single-locus micro-satellite DNA analyses to elucidate the genetics, phylogeny, and taxonomic relationships of the various Channel Island song sparrow populations.
- develop and implement a program to control and/or eradicate feral cats on San Clemente island.

Monitoring Needs

Song sparrows are generally easily detected on Breeding Bird Surveys (BBS) and Christmas Bird Counts (CBC). However, there are no BBS or CBC counts currently being conducted on islands that the Channel Island song sparrow currently breeds, and both of these survey methods do not permit one to monitor population changes with respect to changes in habitats. Song sparrows are, however, well sampled by off-road point counts and constant effort mist-netting (Ralph et al. 1993).

Annual monitoring should include off-road variable circular plots (VCPs) stratified by habitat type and constant effort mist-netting (CEM). Annual monitoring using these two methods will develop data that can be used to (1) monitor population changes with respect to changes in habitats, and (2) estimate annual adult survival and breeding productivity via CEM (e. g. Maps program; DeSante et al. 1993).

Literature Cited

American Ornithologists' Union. 1957. Check-list of North American Birds. 6th edition. American Ornithologist's Union, Washington, D.C.

Beal, F. E. L. 1910. Birds of California in relation to the fruit industry. Biol. Surv. Bull. 34:1-96.

California Department of Fish and Game. 1992. Bird species of special concern. Unubl. List, July 1992, Calif. Dep. Fish & Game, 1416 Ninth St., Sacramento, CA 95814.

Collins, P. 1979. The San Miguel Island song sparrow, in Natural Resources Study of the Channel Islands National Monument, California (D. M. Power, ed.), pp. 10.1-10.24. Santa Barbara Museum of Natural History, Santa Barbara.

DeSante, D. F., Burton, K. M., and Williams, O. E. 1993. The monitoring avian productivity and survivorship (MAPS) program second (1992) annual report. Bird Populations 1: 1-28.

Fancy, S. G. 2000. Review of the Channel Islands National Park landbird monitoring protocol. Unpublished report to Channel Islands National Park, Ventura. (order from Channel Islands National Park, 1901 Spinnaker Dr., Ventura, CA 93001).

Grinnell, J. 1897. Report on the birds recorded during a visit to the islands of Santa Barbara, San Nicolas, and San Clemente, in the spring of 1897. Pasadena Acad. of Sci. Publ., No. 1.

Grinnell, J. 1928. The song sparrow of San Miguel Island, California. Proc. Biol. Soc. Wash. 41:37-38.

Grinnell, J., and Daggett, F. S. 1903. An ornithological visit to Los Coronados Islands, Lower California. Auk 20:27-37.

Grinnell, J., and Miller, A. H. 1944. The distribution of the birds of California. Pac. Coast Avifauna 27.

Howell, A. B. 1917. Birds of the islands off the coast of southern California. Pac. Coast Avifauna 12.

Huber, L. N. 1968. Preliminary Report of San Mogul Island and adjacent Islets, Prince and Castle Rock, 28 May – 7 June. Unpubl. manuscript. Pacific Ocean Biological Survey Program, Smithsonian Institution. Washington D. C.

Hunt, G. L., Jr., and M. W. Hunt. 1974. Trophic levels and turnover rates: The avifauna of Santa Barbara Island, California. Condor 76:363-369.

Jones, H. L., and Collins, P. W. In press. Birds of California's Channel Islands: Their Status and Distribution. Santa Barbara Museum of Natural History, Santa Barbara.

Leatherwood, S., and Coulombe, H. N. 1972. San Clemente Island natural resources survey: a progress report to Naval Ocean Systems Center. Report on file, Naval Air Station, North Island, San Diego, Ca.

Linton, C. B. 1908. Notes from San Clemente Island. Condor 10: 82-86.

Lynch, J. F., and Johnson, N. K. 1974. Turnover and equilibria in insular avifaunas, with special reference to the California Channel Islands. Condor 76:370-384.

Marshall, J. T., Jr. 1948. Ecologic races of song sparrows in the San Francisco Bay region. Part I. Habitat and abundance. Condor 50:193-215.

Miller, A. H. 1951. A comparison of the avifauna of Santa Cruz and Santa Rosa Islands, California. Condor 53:117-123.

Patten, M. A. 2001. The roles of Habitat and Signalling in Speciation: Evidence from a Contact Zone of Two Song Sparrow (*Melospiza melodia*) Subspecies. Ph.D. dissertation, University of California, Riverside.

Philbrick, R. N. 1972. The plants of Santa Barbara Island. Madrono 21(2):329-393.

Ralph, C.J., Geupel, G. R., Pyle, P., Martin, T. E., and DeSante, D. F. 1993. Field Methods for Monitoring Landbirds. USDA Forest Serv. Publ., PSW-GTR 144, Albany, CA.

Remsen, J. V. 1978. Bird species of special concern in California: An annotated list of declining or vulnerable bird species. Nongame Wildl. Invest., Wildl. Mgmt. Branch Admin Rept. 78-1. Calif. Dept. Fish & Game, 1416 Ninth St., Sacramento, CA 95814.

Sauer, J. R., Hines, J. E., Thomas, I., Fallon, J., and Gough, G. 2000. The North American Breeding Bird Survey, results and analysis 1966-1999. Version 98.1, USGS Patuxent Wildl. Res. Ctr., Laurel MD (http://www.mbr-pwrc.usgs.gov/bbs/bbs.html).

Shuford, W. D. 1993. The Marin County Breeding Bird Atlas. A Distributional and Natural History of Coastal California Birds. Avifauna Ser.1. Bushtit Books, Bolinas, CA.

Smail, J., and Henderson, R. P. 1974. Part II. Santa Barbara Island, in The status of the song sparrow and Bewick's wren on San Clemente Island and Santa Barbara Island, California. (R. M. Stewart and J. Smail, eds.), pp. 31-45. Unpublished report to U. S. Fish and Wildlife Service, Endangered Species Office, Sacramento, CA.

Sogge, M. K., Kern, M. D., Kern, R., and van Riper III, C. 1991. Growth and development of thermoregulation in nestling San Miguel Island Song sparrows. Condor 93:773-776.

Sogge, M. K., and van Riper III, C. 1988. Breeding biology and population dynamics of the San Miguel Island Song sparrow (*Melospiza melodia micronyx*). Tech. Rep. 26, Coop. National Park Resources Stud. Unit, Univ. of California, Davis.

Stewart, R. M., and Clow, W. C. 1974. Part I. San Clemente Island, in The status of the song sparrow and Bewick's wren on San Clemente Island and Santa Barbara Island, California. (R. M. Stewart and J. Smail, eds.), pp. 1-30. Unpublished report to U. S. Fish and Wildlife Service, Endangered Species Office, Sacramento, CA.

Stewart, R. M., and Smail, J. 1974. The Status of the song Sparrow and Bewick's Wren on San Clemente Island and Santa Barbara Island, California. Unpublished report to U. S. Fish and Wildlife Service, Endangered Species Office, Sacramento, CA.

Sumner, L. 1958. The rabbits of Santa Barbara Island, a progress report and summary. Unpubl. report, Channel Islands National Park, Ventura.

Sumner, E. L., and Bond, R. M. 1939. An Investigation of Santa Barbara, Anacapa and San Miguel Islands, California. Unpubl. report prepared for National Park Service.

Townsend, C. H. 1890. Scientific results of exploration by the U. S. Fish Commission Albatross. No. XIV - Birds from the coasts of western North America and adjacent islands, collected in 1888-89, with descriptions of new species. Proc. U. S. Nat. Mus. 13:131-142.

U. S. Fish and Wildlife Service. 1983. Removal of the Santa Barbara Song Sparrow from the list of endangered species. Federal Register 48(198):46336.

Willett, G. 1910. A summer trip to the Northern Santa Barbara Islands. Condor 12:170-174.

Willett, G. 1912. Birds of the Pacific slope of southern California. Pac. Coast Avifauna 7.

Willett, G. 1933. A revised list of the birds of southwestern California. Pac. Coast Avifauna 21.

Wright, H. W., and Snyder, G. K. 1913. Birds observed in the Summer of 1912 among the Santa Barbara Islands. Condor 15: 86-92.